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Application No. 10/615,443

Confirmation No. 7388

Examiner: Harry B. Tanner
Art Unit 3744

RE: APPLICANT REPLY TO FIRST OFFICE ACTION

08-17-2004

Attn: Harry B. Tanner

This cover letter and attached materials come in response to the first office action on the above application, posted 6/22/2004. This package contains amended description, drawings, and claims.

In summary, reference numerals were added to the drawings and description. Description paragraphs 0348.1-0348.14 were added. Drawing changes are noted in red. Claims 2-125, 127-161, 164-186, 189-194, 197,198, 205, 207-218, 220-271 have been cancelled. Remaining claims are (AMENDED) and claims 272-306 are (NEW).

The content of the claims has been re-stated to clarify the subject matter of the invention as understood. The apparatus claims and method claims have been separated and phrased accordingly. If there are any formatting issues that remain with the language of the claims, these can easily be re-stated, as the subject matter of the invention is valid and clear. Basically put, the apparatus of claim 1 contains the necessary components for performing the required means-plus or step-functions in subsequent method claims. These outline "A Method and Apparatus for Flow-Pressure Control and Monitoring of Constant or Variable Volume Air-Fluid Distribution Systems, Terminal Devices, and Prime Movers comprising..." This central idea is also used as an alternative title for the invention.

In HVAC terms, this is basically a building control method for such systems and components as described, but is put forth in broader terms to adequately cover other arts to which it may apply. The invention may be summarized as a multi-point sensing module that utilizes coordinated x/y data points with a curve plotter to illustrate mover, system, and terminal device (damper or valve) performance characteristics in their correct context and effectively manipulate them to control the setting or placement of the system operating point, the central coordinate to all mover-system changes. In prior practice, these components were viewed independently of one another and out of context and, thus, performance could neither be accurately predicted, nor precisely controlled.

The invention also establishes mover and valve constants from the origin of “wide open flow” prior to predicating any performance coordinates or assigning x/y values. The total power of the system mover is also evaluated through Total Wattage and Total Pressure as these are effectively applied to the distribution system and its changes. The mover’s constant is also accurately deducted through corrective BHP and driven RPM readings, those considered among the most accurate data obtained from such a system.

The specification and claims are structured around the method and apparatus, which clearly describe the steps of the method. Any interpreted or so-called “result” of the method is, however, based on known scientific facts and previously acknowledged procedures of arriving at such results readily predictable or able to be firmly established by *interpolation and not extrapolation*. The numerous functions also have antecedent basis in the description.

Claims proceed from deductive sensor logic and/or affinity laws placing the performance in a predictable area of the Cartesian graphs shown in the figure drawings. Despite disparate comments in claims, the steps of the process, beginning with the “Initial Point of System Operation”, are clearly outlined in the description and proceed with a solid train of known performance characteristics.

The method and apparatus is intended to be modular and expandable with a plurality of components, but may be reduced to: a single primary mover with speed control, a ducted system, a damper-actuator within the system, a flow monitor housing with Total, Static, and Velocity pressure sensors, a signal processor with display panel.

The functions described in the claims are necessitated by known principles to achieve true correctness of system performance as currently known, as there is no other correct evaluation of a mover-distribution system’s performance than that described in this specification.

As an example, the specification asserts that both Static and Velocity sensing must be jointly and properly employed as described to avoid incorrect sensor evaluation such as “undue flow” or “undue restriction” from sensors. And subsequent diagnosis of adverse

mover performance, solving all such unknowns also cannot be determined another way. The correct solution of unknowns are also arrived at through interpolated data, as must be required for correct system performance or even estimation, though never previously claimed.

As indicated in the specification, Static Pressure sensing will always be compromised by the fact that "...static increases can be equally representative of restriction as they are of fan power applied effectively." For example, blockage in a duct will show higher Static readings not attributable to actual air movement or useful power distribution. Also, in the context of an unknown system, dampering being placed upstream or downstream of a damper or valve location can also distort these readings, rendering them completely unreliable.

Although duly noted, the references cited in the first office action also employ Static sensing through mechanical means, namely tensioning springs calibrated to inches of water column – also a static projection of system performance, and responding to linear actuation based on thermostatic feedback.

The specification clearly points out current problems pertaining to the industry or art that render current art practices in these areas partly or wholly incorrect with no recourse or solution for such procedures which can in no other way be addressed than as is already stated in this specification. For instance, current sensor use relies primarily on Static Pressure sensing, when it is a known fact that Static sensing (or its voltage counterpart) is among the least accurate means of data processing or signal transduction. In fact, this problem still remains in various claims and patents that have already been granted, these centered on any form of Static sensing or voltage and signaling by such means, whether in HVAC or other art.

The subject matter as stated in this specification remains based in reality and the tangible conclusions result from facts already known and firmly established. Therefore, such a method or apparatus has not yet been claimed prior to this application. For this reason it remains valid and still stands. Thus, the claims may be objected to due to any unfamiliar formatting as described, but should not be wholly rejected on a singular basis.

Finally, the added description further expounds on VAV (Variable Air Volume) systems and the Final Pressure Constant as established by the method. This may serve as its "Best Mode of Operation" and point out for the examination how the method uses the various embodiments already described in the source document to alter or manipulate the operating point of a distribution system and its mover.



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